

## PA's Efforts to Address Operation, Maintenance and Replacement of AMD Passive Treatment Systems

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## The Need?

**Over \$60 million worth of publicly funded AMD passive treatment facilities currently in operation in PA. Source: OSM AMD Databas**

## The Need

- More than 275 AMD passive treatment systems project sites are known to exist in Pennsylvania.
- State funding through the Growing Greener and Growing Greener II program (\$625 million over 6 years)

## The Need

- Original O,M,&R Workgroup formed in 2001-Recommendations made to Department Secretary
- Group revived/expanded in 2003 with new recommendations
- Group focused on AMD needs, but also included O,M, &R concerns on Non-AMD structures

## Why Operation and Maintenance?

- "An ounce of prevention is worth a pound of cure." - Ben Franklin
- Systems that are not maintained are destined to fail!!
- Failed systems can have significant environmental consequences.

## What Does O, M & R Involve?



## Operation Examples

- Inspections
- Litter control
- Vegetation control
- Mechanical maintenance (flushing)
- Insect and vector control
- Monitoring – water sampling
- Physical stability and erosion control



## Routine Operations: Treatment System Sampling



## Routine Operations: Debris Removal



## Routine Operations: Flushing



## Maintenance Examples

- Dredging and sediment removal
- Repairing damage after major storm events
- Repairing cracks or leaks
- Repairing damage from vandalism
- Adding limestone, compost, sand, or gravel
- Adjusting grade or outlet structures

## Maintenance: Baffle Repair



Maintenance:  
Influent Modification



Oven Run Site B: Modify Inlet Structure



Oven Run Site B: Accumulated Iron



Oven Run Site B: Iron Removal



Oven Run Site B: Compost Replacement

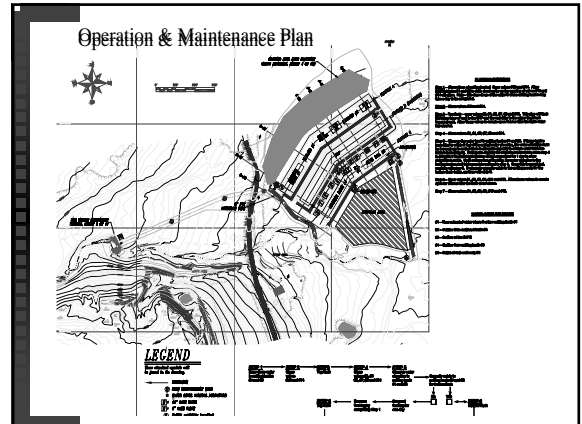


Audenreid Treatment System



## Replacement Concerns

- Estimate BMP design life
- Incorporate new technology
- What is the cost to replace?
- Who will replace?



## What Does O, M & R Cost?



## Calculating O, M & R Costs

- **Calculation of factor:**  $[(\text{actual total O,M\&R costs})/(\text{life of system})/(\text{construction cost})] \times 100$
- **Calculated an Average O, M & R Factor of 4%**
- **Use of factor:** Construction Cost X (O,M&R factor) = average annual O,M&R for project
- **Example:** \$200,000 project with 4% factor will cost an average \$8,000 per year for O,M&R

## Average Annual Factors for AMD Treatment Systems \*

- Vertical Flow Systems..... 5%
- Anoxic Limestone Drain Systems..... 4%
- Compost Anaerobic wetlands..... 4%
- Pyrolusite© Systems..... 3%
- Open limestone channels..... 1%
- Lime sand addition programs..... 33-50%
- Automated lime doser..... 13%

\* Annual percentage of construction costs

## Breakdown of O, M & R Costs for Vertical Flow Systems

- Routine operations (sampling,..... 20.0%  
inspections, flushing)
- Water sample lab analyses ..... 10%
- Maintenance – repairs & supplies ..... 30%
- System reconstruction..... 40%

Note: This is a breakdown of the expected 5% of construction costs needed for annual maintenance of vertical flow systems

## How Can Costs Be Reduced?

- Sponsor who takes on projected O & M activities would lessen the O, M & R costs by 20%-60%
- ◆ Examples:
  - ◆ Sponsor handles routine operation and maintenance (monitoring, sampling, etc.)
  - ◆ Major maintenance and replacement costs are based on government bid projects; sponsors who are creative with local resources may decrease these costs

## Guiding Principles for Projects in Pennsylvania

*True Sustainable Operation,  
Maintenance & Replacement  
is based on **LOCAL**  
**COMMUNITY** Ownership  
& Involvement*



## Workgroup Breakdown of Responsibilities

- Routine Operations (20%) : Local Group
- Lab Analyses (10%): DEP (or other gov't source)
- Maintenance (30%): Gov't & Local Group
- Replacement Cost (40%): Gov't
- Total Cost: Gov't – 65%,  
Local Group – 35% (can be in-kind match)

## Revised 11/5/03 Recommendations:

### Recommendation #1: Funding

- Funding now available through Growing Greener for non-routine repairs and replacement
- Department is looking very seriously at additional ways to provide sustainability.

### Recommendation #2: Quick Response

WPCAMR has received a \$350,000 grant under this year's Growing Greener II funding to establish and administer a Quick Response program.

### Recommendation #3: Lab Analysis

WPCAMR received a Growing Greener grant last year to establish and administer a lab analysis funding program for watershed groups to monitor their treatment system.

### Web Sites

[http://www.dep.state.pa.us/dep/deputate/minres/bamr/amd/science\\_of\\_AMD.htm](http://www.dep.state.pa.us/dep/deputate/minres/bamr/amd/science_of_AMD.htm)

<http://audenreid.blogspot.com/>

<http://www.orangewaternetwork.org/>

<http://www.amrclearinghouse.org/>

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